

INSPECTION REPORT
April 15, 1977

Confidential Claim Retracted

Authorized by: SC

Date: 6/30/13

Bluewater Mill
The Anaconda Company
Valencia County, New Mexico

U. S. Geological Survey
Conservation Division
Area Mining Supervisor
Southern Rocky Mountain Area
P. O. Box 1716
Carlsbad, New Mexico 88220

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Mining Engineer
May 24, 1977



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POL-EPA01-0006646

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The Anaconda Company's Bluewater Mill was inspected April 15, 1977, by the writer and Don Dixon, Superintendent of Mill Maintenance. The primary purpose of the tour was examination of the method used to sample the uranium ore for royalty determination purposes prior to processing.

The Bluewater Mill is located just east of Interstate Highway 40 about 8 miles northwest of Grants in Valencia County, New Mexico. The facility uses a hydrometallurgical process to extract uranium oxide (U_3O_8), commonly known as yellowcake, from the ore which is mined from the company's open-pit and underground workings on Pueblo of Laguna lands near Pagate about 50 miles to the east. The ore is transported from the mine to the mill in 100-ton, bottom-dump rail cars by the Atchinson Topeka and Santa Fe (ATSF) Railroad. Presently, the mill processes an average of about 2000 tons of ore per day (TPD), but on-going expansion and modification of the facility will increase its capacity to about 6000 TPD as well as allowing the processing of lower grade ore. The company currently has a considerable amount of its ore toll milled at Kerr-McGee Corporation's mill in Ambrosia Lake near Grants and at Sohio's mill which is about 5 miles north of the lessee's mining operations.

Upon arriving at the mill site, each railroad car is weighed on Fairbanks-Morse track scales at the ore trestle, and this weight is used for royalty determination purposes. The scales are checked every 3 months by the ATSF Scale Department who report the results to the New Mexico State Corporation Commission and to the Trans-Continental Freight Bureau, South Pacific Coast Territory, in San Francisco, California.

After being weighed, each railroad car is dumped into one of four bays under the ore trestle according to the grade of ore in the car as determined by the scanner at the mine railhead. The ore in each alley is thereby kept at an average grade of $0.255\% + 0.02\% U_3O_8$, and this assures a uniform feed grade for the mill. The recipient alley and the car weight are recorded, and when the alley contains about eight carloads, it is known as a mill lot. Each lot is removed individually by a front-end loader and put into a Cedar-Rapids jaw crusher (25 x 40). From the jaw crusher, the ore is carried by conveyer belt to a sizing screen where oversized material is removed and recycled through a Cedar Rapids impact breaker (30 x 30). When properly sized, all of the ore is carried by conveyor belt to the sampling tower.


The sampling tower contains an automatic, continuous sampling system consisting of three automatic Geary-Jennings samplers, two Syntron vibrating feeders, one Tyler-Niagara vibrating screen, and two small Traylor gyratory crushers. The system is of AEC design.

The first sampler takes a 10% cut of the ore, about 200 pounds per ton, which is then fed via vibrating feeder into the second sampler which takes another 10% cut, or about 20 pounds per ton of ore. The second cut is then sized by the vibrating screen (oversized material is reduced by the gyratory crushers) and fed via vibrating feeder into the third, and final, sampler which takes another 10% cut, or about 1.5 pounds per ton of ore. All reject material from the sampling system is routed on to the five 500-ton fine ore bins and subsequently on into the milling circuit.

The final sample, approximately 1.5 pounds of ore, is assayed, and the uranium content thereby obtained is used for determining the royalty due. In the past, grab samples were taken from the railroad cars for moisture analysis, but this is now done in the sample tower. A sample of each ore lot is kept for an umpire assay in case the original assay result is disputed.

Although the milling circuit is physically quite complex, the hydrometallurgical process is actually very simple. The ore is leached with sulphuric acid which removes the uranium oxide and places it in solution. This solution is then mixed with resin beads which collect the U_3O_8 on their outer surfaces. The U_3O_8 is washed from the beads to form a pregnant solution from which the U_3O_8 is precipitated out. The precipitate, or yellowcake, is then dried and packed into 500-pound, sealed metal drums for shipment to the respective buyers. Four yellowcake samples are taken from each drum—one for Anaconda, one for the buyer, and two umpire samples.

In the past, the Bluewater Mill also had a circuit which utilized carbonate leaching so that limestone uranium ore could be processed. This system was closed in 1975, and United Nuclear - Homestake Partners' mill between Ambrosia Lake and Grants is the only mill now capable of refining limestone ores. When the on-going expansion and modification are complete, the Bluewater Mill will utilize solvent extraction instead of the resin beads. This will not change the basic hydrometallurgical process but will increase the mill capacity and allow the processing of lower grade ore. Solvent extraction is used at Kerr-McGee Corporation's mill in Ambrosia Lake.


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Orig. to: Superintendent, Southern Pueblos Agency, BIA
cc: Governor, Pueblo of Laguna
Chief Branch of Mining Operations, USGS
Through: Conservation Manager, Central Region, USGS
Area Mining Supervisor, SRMA, USGS
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